

**DETAILED ACTION**

***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 13-22 and 23 are rejected under 35 U.S.C. 102(b) as being anticipated by Sleffel.

Hiraki et al. discloses a fuel-injection system 6 for direct injection of fuel into a combustion chamber through a combustion-chamber top located opposite from a piston 2, comprising: a fuel injector 1 having a plurality of spray-discharge orifices 7/11 discharging a corresponding plurality of fuel jets 9 and 10a, wherein the plurality of fuel jets form a spray cloud in the combustion chamber; wherein a first opening angle of the spray cloud (combination of jets 9 and 10a) along a first cross-sectional plane bisecting the longitudinal axis of the fuel injector is greater than a second opening angle of the spray cloud of jet 9 along a second cross-sectional plane bisecting the longitudinal axis of the fuel injector, the second cross-sectional plane extending perpendicular to the first cross-sectional plane; wherein the spray cloud is formed in the combustion chamber with a clearance angle between the combustion-chamber top and the spray cloud, and wherein the clearance angle is uniform along the circumference of the spray cloud (see figures 1 and 4).

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 23, 24 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sleffel.

With respect to claim 23, Sleffel teaches all the limitations of the claims except for the fuel injector has 20-40 spray discharge orifices. At the time the invention was made, it would have been an obvious matter of design choice to a person of ordinary skill in the art to provide the device of Sleffel with the fuel injector has 20-40 spray discharge orifices, because Application has not disclosed that the fuel injector has 20-40 spray discharge orifices provides an advantage, is used for a particular purpose, or solves a stated problem. One of ordinary skill in the art, furthermore, would have expected Applicant's invention to perform equally well with either claimed 20-40 spray discharge orifices or the Sleffel's number of orifices. Therefore, it would have been an obvious matter of design choice to modify the device of Hiraki et al. or Bailey to obtain the invention as specified in claim 23.

Sleffel teaches all the limitations of the claims except for the spread angle of approximate of 15 to 25 degrees. At the time the invention was made, it would have been an obvious matter of design choice to a person of ordinary skill in the art to provide the device of Sleffel with the spread angle of approximate of 15 to 25 degrees,

because Application has not disclosed that the spread angle of approximate of 15 to 25 degrees provides an advantage, is used for a particular purpose, or solves a stated problem. One of ordinary skill in the art, furthermore, would have expected Applicant's invention to perform equally well with either claimed spread angle of approximate of 15 to 25 degrees or the Sleffel's spread angle. Therefore, it would have been an obvious matter of design choice to modify the device of Bailey to obtain the invention as specified in claims 24 and 29.

***Allowable Subject Matter***

5. Claims 25-28 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Response to Arguments***

6. Applicant's arguments filed March 04, 2011 have been fully considered but they are not persuasive in view of the Sleffel reference as indicated above.

7. Applicant's arguments with respect to claims 13-24 and 29 have been considered but are moot in view of the new ground(s) of rejection.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to DINH NGUYEN whose telephone number is (571)272-4907. The examiner can normally be reached on Monday-Thursday 6:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Len Tran can be reached on 571-272-1184. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 3752

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Dinh Q Nguyen/  
Primary Examiner, Art Unit 3752

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